

## FURTHER CONTRIBUTIONS TO THE STUDY OF *DALQUESTIA* (OPILIONES: SCLEROSOMATIDAE)<sup>1</sup>

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**ABSTRACT:** *Dalquestia leucopyga* n. sp. is described from northeastern Tamaulipas, Mexico. New localities are provided for *Dalquestia concho* in Chihuahua, Mexico, *Dalquestia formosa* in Texas, USA, and *Dalquestia grasshoffi* in Durango, Mexico. The first record of *D. formosa* in Mexico is also provided from Nuevo León. Additional biological notes are provided for *D. formosa* in Texas.

**RESUMEN:** *Dalquestia leucopyga*, sp. n., es descrita de Tamaulipas del noreste, México. Los nuevos lugares se proporcionan para el *Dalquestia concho* Cokendolpher en Chihuahua, México, *Dalquestia formosa* (Banks) en Tejas, los EEUU, y el *Dalquestia grasshoffi* Cokendolpher en Durango, México. El primer expediente de *D. formosa* en México también se proporciona de Nuevo León. Las notas biológicas adicionales se proporcionan para *D. formosa* en Tejas.

Since the original description of *Dalquestia* (Cokendolpher, 1984), two papers have been published relative to this genus. Cokendolpher & Stockwell (1986) described a new species from Arizona, USA, and provided a revised key to the species of the genus. Tsurusaki & Cokendolpher (1990) reported the first karyotype of any member of *Dalquestia* (*D. formosa*).

The higher classification of the Phalangioidea Opiliones remains unsettled. Although it is clear that *Dalquestia* belongs to an unnamed assemblage (family or subfamily?) with *Metopilio* Roewer, *Diguetinus* Roewer, *Eurybunus* Banks, and *Globipes* Banks, their relationship to other Phalangioidea is unclear. In the latest catalogue to the genera of Phalangioidea, Crawford (1992) listed the *Metopilio* assemblage (equivalent to subfamily) within the Sclerosomatidae. For lack of better evidence, Cokendolpher & Lee (1993) and Kury & Cokendolpher (in press) followed this assignment in catalogues to the Opiliones of North America.

Almost a decade ago, Marie Goodnight gave the senior author a large collection of harvestmen which she and Clarence Goodnight had accumulated over the years as the reigning authorities on North American Opiliones. Among this material is a new species of *Dalquestia* as well as several new records of the genus. Herein we describe that species and provide records and biological data obtained since the original publication of the genus.

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## METHODS

The description format and terms essentially follow those of Cokendolpher (1984). The penis was examined and illustrated while it was immersed in K-Y® Brand Jelly (Ortho Pharmaceutical Corp., Raritan, New Jersey, USA) on a depression slide. To our knowledge this is the first time this material has been used with Opiliones. This clear jelly is water/alcohol soluble and thick enough to hold the object under study in any position. Museum collections reported here are: American Museum of Natural History, New York (AMNH); Texas Memorial Museum, Austin (TMM); personal collection of J. C. Cokendolpher (JCC).

*Dalquestia leucopyga*, NEW SPECIES

(Figs. 1-7).

*Dalquestia* n. sp. 1 Tamaulipas (endemic): Kury & Cokendolpher, in press.

**Diagnosis.**— Each abdominal tergite with two rows of tubercles, tubercles of anterior row smaller than in posterior row; white spot at tip of abdomen dorsally; tibia II without pseudosegments, sharply bicolored; basal cheliceral segment with laterally compressed subconical spur below, a few small tubercles above.

**Identification.**— All species of *Dalquestia* thus far known are found in widely separated and geographically isolated areas. Identifications can usually be made by referring to the map in Cokendolpher (1984), with the addition of *D. rothorum* Cokendolpher & Stockwell, 1986, from Arizona, USA. Possibly because of these isolated distributions, the genitalia of *Dalquestia* members are very conservative and appear similar. This is the opposite of *Metopilio* spp. which are often sympatric. A key to the species of *Dalquestia* (based entirely on external features of adults) is provided by Cokendolpher & Stockwell (1986). In that key, *D. leucopyga* will be identified as *D. rothorum*. *Dalquestia leucopyga* is easily distinguished from *D. rothorum* on the basis of the chelicerae. *D. leucopyga* has a spur on the basal segment of the chelicera and lacks tubercles on the distal article of the chelicera. These two are also widely separated in their distributions. *Dalquestia rothorum* is known only from a live oak riparian zone on a mountain surrounded by desert in Arizona. *Dalquestia leucopyga* is thus far known only from the coastal plain in north-eastern Tamaulipas.

**Etymology.**— The specific name is Greek (*leuc* = white and *pyg* = rump) and refers to the white spot found on the posterior end of the abdomen.

**Type data.**— Male holotype from Km 158 on Highway 110, about 7 km SW of San Fernando, Tamaulipas, Mexico, 60-90 m elev., 22 Feb. 1973, T. R. Mollhagen (AMNH).

**Description.**—Based on the male holotype. With the characters of the genus (Cokendolpher, 1984). Total length 4.95 mm, greatest width 3.00 mm, maximum height 2.35 mm. Dorsum brown, lighter on borders of cephalothorax and anterior portion of abdomen, with two small whitish median spots on segments I, II, and larger creamy white spot distally on abdomen (tergites VI distally, VII). Cephalothorax densely covered with low rounded granules and with a transverse row of larger tubercles along posterior margin; preocular area on anterior margin with pointed denticles medially; pair of pointed tubercles between pores and preocular tubercles. Ocular tubercle dark brown, contrasting somewhat with surrounding portion of cephalothorax; length 0.40 mm, width 0.40 mm, height 0.20 mm; eyes flanked medially by two rows of 7 tubercles. Each tergite with double rows of tubercles, tubercles of anterior rows smaller than those of posterior rows (Fig. 1). Genital operculum length 1.70 mm, width at neck 0.70 mm, width at base 1.55 mm. Genital operculum creamy yellow; leg coxae and trochanters creamy yellow with pointed tubercles. Sternites brownish-yellow with small brownish granules on extreme lateral edges; posterior half of sternite VIII, all of sternite IX, and anal operculum darker brown with dense, rounded brown granules. Pedipalp with coxa and trochanter yellow; femur, patella, and tibia yellow brown; tarsus yellowish; all segments except tarsus with numerous tubercles; tarsus with ventral rows of denticles; tips of claws black. Palpal segment lengths: femur 1.10 mm, patella 0.80 mm, tibia 1.10 mm, tarsus 1.30 mm. Chelicera creamy yellow with short blackish setae on anterior and medial faces (Figs. 2, 3); basal segment with laterally compressed subconical tubercle ventrally (Fig. 2). Leg segments yellowish-brown except as follows: femur, patella, and tibia of leg I light orange brown; tibia I shaded to narrow whitish distal band; femur of leg II with narrow brown band distally, patella II light brown, tibia II brown on basal two thirds and whitish on distal third; tibiae III-IV light brownish with narrow whitish band distally. All legs with longitudinal rows of tubercles; tibiae and metatarsi lacking pseudosegments; femora and tibiae strongly angular in cross-section. Femora I-IV lengths (respectively, in mm): 2.00, 5.90, 2.10, 3.20; tibiae I-IV lengths: 2.10, 4.60, 1.90, 2.40. Penis as in Figs. 4-7; length 3.85 mm.

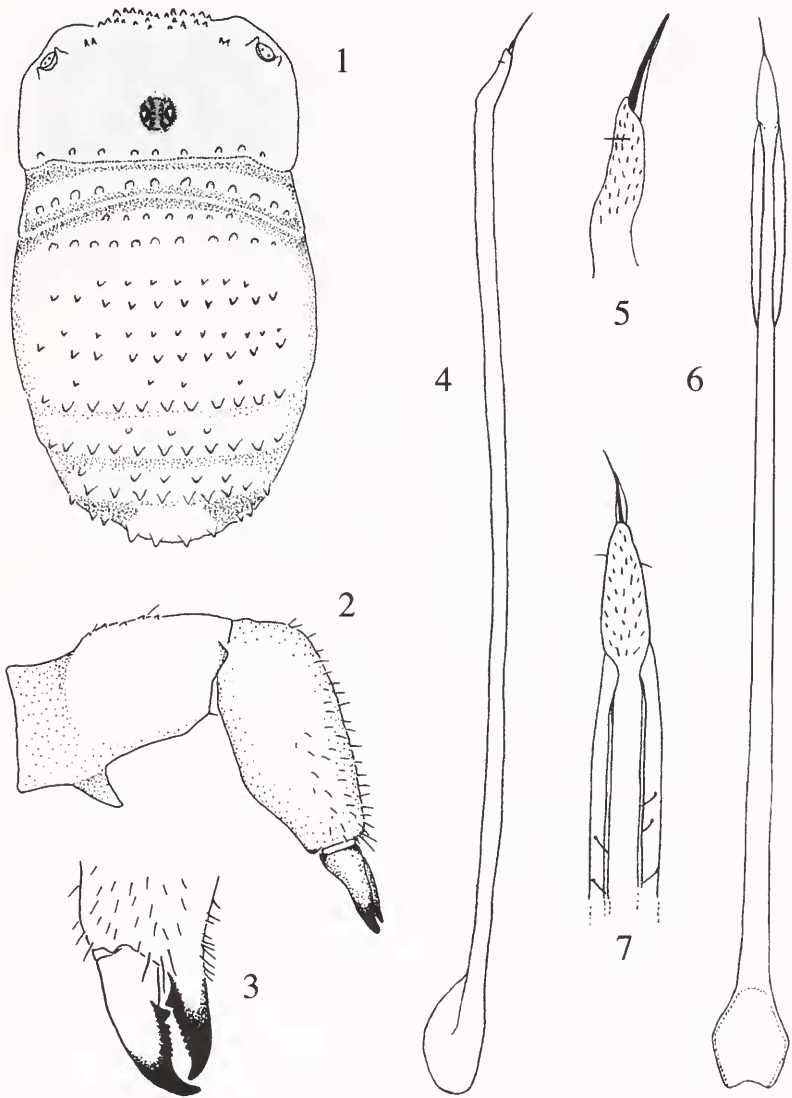
**Female:** Unknown.

**Specimens examined.**— Only the holotype.

### *Dalquestia formosa* (Banks)

Kury & Cokendolpher (in press) listed this species from Nuevo León but did not provide any details. The only known record for the state as well as many new records from Texas are listed below.

**New Records.**— MEXICO: NUEVO LEÓN: Cuevas Buenavistas, Sierra de Lampasos, E. of Bustamante, 15 Sept. 1985 (T. Raines), 1 female (TMM). USA: TEXAS: Bexar Co., Friedrich Wilderness Area, north of San Antonio, 366-381 m elev., 6 Feb. 1983 (F. E. Walker) 1 male, 4 females, eggs, 1st instars reared from eggs (TMM). Blanco Co., Rough Hollow Creek and Hwy. 2766, 6 km E. Johnson City, 3 Oct. 1994 (A. G. Grubbs), 1 male (TMM); Flat Creek Ranch, 19.3 km E. Johnson City, 28 May 1995 (A. G. Grubbs), 1 male (TMM). Brewster Co., Chisos Mountains, Big Bend National Park, 1,676 m elev., 28 June 1947 (C. L. Remington), 1 male, 3 juv. (AMNH); 1,829 m elev., 29 June 1947 (C. L. Remington), 1 male, 5 juv. (AMNH); The Basin, 2 July 1947 (C. L. & J. E. Remington), 1 male, 1 female (JCC); 16 June 1948 (M. Cazier), 1 male (AMNH); Lost Mine Trail, 19 March 1991 (K. McWest & T. J. Fuller) 1 female, 1st instars from eggs (TMM). Burnett Co., Simons Squirm-Around Cave, 20 Nov. 1990 (J. Reddell, M. Reyes), 1 female (TMM); Simons Water Cave, 12 Nov. 1990 (J. Reddell, M. Reyes, M. Warton), 1 male (TMM); Snake Pit Cave, 20 Nov. 1990 (J. Reddell, M. Reyes), 1 female (TMM); FM 2341, 19.3 km NW Burnet, 13 Oct. 1994 (A. G. Grubbs), 1 male (TMM); Gridiron Creek, 7.2 km NW Spicewood, 27 Sept. 1994 (A. G. Grubbs), 1 male (TMM); Co. Rd.



Figs. 1-7. *Dalquestia leucopyga* n. sp. male. 1, dorsum of body; 2, mesal view of left chelicera; 3, anterior view of left cheliceral jaws; 4, lateral view of penis; 5, enlargement, lateral view of distal end of penis; 6, ventral view of penis; 7, enlargement, ventral view of distal end of penis.

404, 2.4 km W. Spicewood, 9 Nov. 1994 (A. G. Grubbs), 1 female (TMM); 2.6 km SW Smithwick, 13 Oct. 1994 (A. G. Grubbs), 1 male (TMM); 2.6 km S. Marble Falls, 20 Sept. 1994 (A. G. Grubbs), 1 juv. (TMM). Gillespie Co., 12.9 km NW Fredericksburg, 24 Oct. 1985 (J. C. and J. E. Cokendolpher), 1 juv. (TMM). Hays Co., Recharge Farms, 8 km NNW San Marcos, 2 Feb. 1983 (A. G. Grubbs), 2 males (TMM). Kerr Co., 1.6 km NE Mountain Home, 7 June 1988 (B. J. Nichols), 1 male (TMM), 21-24 July 1988 (B. J. Nichols), 1 male (JCC); 3.2 km SSE Center Point (W. Rogers, et al.), 7 May 1983, 1 juv. (TMM); 25 June-2 July 1983, 1 juv. (TMM); 16-23 Sept. 1983, 1 juv. (TMM); 16 Oct. 1983, 2 males (JCC), 7 males, 1 female (TMM); 4-11 Feb. 1984, 1 juv. (TMM); 27 May-4 June 1984, 2 juv. (TMM); 6.4 km E. Kerrville, 16 Oct. 1983 (W. Rogers), 1 juv. (TMM); 6.4 km E. Kerrville (W. Rogers, et al.), 7 May 1983, 1 juv. (TMM); 27 May-4 June 1983, 7 juv. (TMM); 25 June 1985, 2 females (TMM); 20-26 Aug. 1983, 2 juv. (TMM); 23 Sept. 1983, 1 juv. (TMM). Travis Co., Bee Creek Nature Preserve, Austin, 21 June 1988 (S. W. Taber), 1 female (JCC); Adobe Springs Cave, 29 May 1989 (W. Elliott, J. Reddell, M. Reyes), 1 juv. (TMM); Sunset Canyon, W Austin, 6.4 km E. Dripping Springs, 17 Oct. 1985 (W. R. Elliott), 1 male, 2 females (TMM). Uvalde Co., Jester's Gold Cave, 4 April 1993 (J. Loftin), 1 female (TMM). Val Verde Co., 8 km S. Loma Alta on Rt. 277, 9 June 1984 (S.A. Stockwell), 1 juv (JCC); 33.8 km N. Langtry, 15 April 1973 (C. McConnell), 2 females (JCC); 16 April 1973 (T. R. Mollhagen), 2 females (JCC).

**Natural history.**— A female from near San Antonio, Texas, laid 34 eggs on either 21 or 22 Feb. 1983. Twenty-seven eggs hatched on 28-29 April 1983. This developmental time was at about 22° C. A female collected in Big Bend National Park on 19 March 1991 laid eggs the following weekend. The number of eggs is not available for this female because the egg mass began to decay before a count could be made.

Almost all of the specimen vials which are labeled with habitat data mention some sort of juniper habitat. Piñon-juniper habitats are recorded in the Chisos Mountains. Juniper (primarily *Juniperus ashei* Buchh.) habitats (often semi-arid) are recorded from central and north-central areas of this species range. According to Walker (pers. comm., 6 Feb. 1983), *D. formosa* occurs north of San Antonio in an area of *J. ashei* and rocks. On the lower slopes, where the area is not as arid, the junipers grow thickly and litter the ground with their needles. No *D. formosa* were encountered in this region. Higher up on the slopes where it is more arid and the vegetation is more sparse, *D. formosa* was encountered under rocks.

During an extensive pitfall trapping study in central Texas (13,440 trap nights spread over a year in eight localities, Phillips, et al., 1986), only 57 *D. formosa* were collected. Four habitat types were sampled during the trapping: juniper-grassland, live oak-grassland, grazed pasture-grassland, and southern cypress-grassland communities. *Dalquestia formosa* was only collected in *J. ashei*-grasslands. Those collections are plotted in Fig. 8. Pitfall trapping does not appear to be a good method to obtain life history data on *D. formosa*. Apparently, the younger instars either spend their time in habitats not sampled by the traps (cracks and holes in the earth), or they are relatively immobile and do not wander far from the site from where they were born. Limited laboratory observations indicate that at least the first two instars of *D. formosa* are very

easily desiccated. They could not survive on the surface except on very moist occasions. We suggest the pitfall trap data are relatively accurate for describing adult activity because those individuals appear to be less sensitive to moisture. Adults are active in October and November, following the decline in the number of juveniles. It appears mating occurs in October and November. Egg laying presumably occurs during the same period. Although a female was collected in June, it is uncertain if it was a newly maturing individual or one that had already over-wintered as an adult. As already noted, females from slightly more southern localities have been observed to lay eggs in February and March. Cokendolpher (1984) reported that adults were known from all months with the majority from July to November. He also stated that two females collected during October were filled with large eggs. His data may be somewhat misleading though, as it includes records from throughout the range of this species.

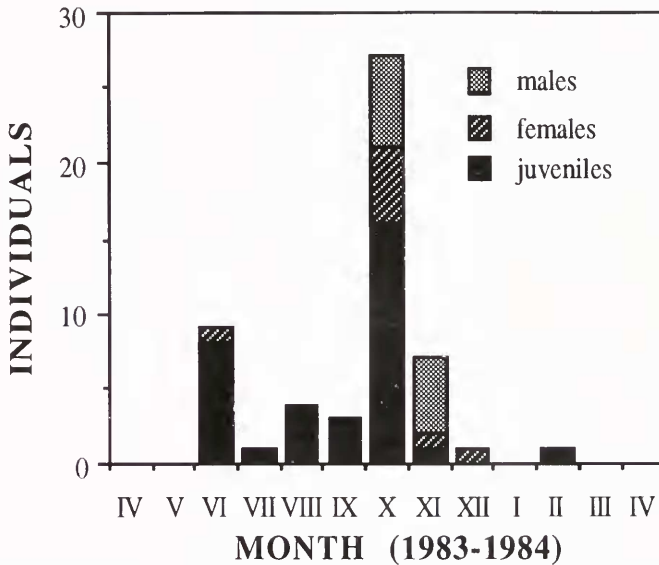


Fig. 8. Monthly collections by pitfall trapping of *Dalquestia formosa* in juniper-grasslands of central Texas.

### *Dalquestia concho* Cokendolpher

**New Record.**— MEXICO: CHIHUAHUA: Torrecillas, 2,103 m elev., 17 August 1947 (G. M. Bradt), 1 juv. (JCC).

**Comment.**— This juvenile does not differ from the original description of that stage. The new record is the southernmost record for the species, but only extending the range south about 60 km from Encino, Durango.



*Dalquestia grasshoffi* Cokendolpher

**Record.**— MEXICO: Hidalgo: Jacala, 20 July 1956 (V. Roth, W. Gertsch), 1 male (JCC).

**Comment.**— The above listed record (from the type locality) is only the second collection of this species. This male does not differ significantly from the original description of the male.

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